

# **Chapter 2**

## **Alternatives**

# **CHAPTER 2 – ALTERNATIVES, INCLUDING THE PROPOSED ACTION**

## **Introduction**

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This chapter describes and compares the alternatives considered by the Forest Service for the Big Thorne Project. It includes a discussion of how the alternatives were developed, a description of each alternative considered, and a map of each alternative considered in detail (included in a separate map packet and on CD). In addition, it includes a description of monitoring and other features common to all action alternatives. This chapter also presents the alternatives in comparative form, focusing on the key, or significant, issues, with the goal of sharply defining the differences among the alternatives and providing a clear basis for choice among options by the decision-maker and the public. Some of the information used to compare the alternatives is based upon the design of the alternative (e.g., helicopter logging versus ground-based and cable logging) and some of the information is based upon the environmental, social, and economic effects of implementing each alternative (e.g., the amount of soil disturbance caused by helicopter logging versus ground-based and cable logging). For a discussion and analysis of site-specific, project-level effects, consult Chapter 3, “Environment and Effects.”

## **Changes between Draft and Final EIS**

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Changes made to the project and the documentation in this Final EIS and the supporting resource reports are primarily in response to public comments on the Draft EIS and additional field reconnaissance. These changes are minor and reflect refinement to the proposed project activities and clarification of the resource effects of the project. They are summarized in the following subsections and described in more detail throughout the Final EIS and the appendices. Note that Appendix B, Unit Cards, in the Draft EIS is now Responses to Comments on the Draft EIS, and Appendix C, Road Cards, in the Draft EIS, is now Unit- and Road-specific Changes between the Draft EIS and Final EIS.

Appendices A and D are the same with minor updates. Unit and Road Cards for the Final EIS alternatives are provided in the project record.

## **Changes to the Alternatives**

Minor changes to the proposed units and roads between the Draft and Final EIS occurred as a result of additional field reconnaissance and other updated information (e.g., updated stream information). Unit and road changes were made to improve economics, improve logging feasibility, adjust legacy, or address new stream information or other resource concerns. Some units and roads were dropped and some were added in each alternative to improve how well each alternative addressed its theme. Other changes or refinements to the Final EIS units, roads, and alternatives were made in response to public comments on the Draft EIS. All units and road changes were from the same unit pool considered in the Draft EIS. Although many small refinements occurred, the net overall effect of these

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changes is minor. The changed units and roads are summarized in Appendix C, Unit- and Road-specific Changes.

In general, the changes resulted in higher acres within harvest units, but lower volumes for each alternative. The lower volumes are a result of a reduction in the amount of clearcutting (even-aged management) and an increase in the amount of partial harvest (uneven-aged single tree selection with 50 or 75 percent retention) in all alternatives, to address comments concerning timber economics and wildlife and watershed impacts. This primarily occurred in units planned for helicopter yarding, with the greatest changes occurring in Alternatives 4 and 5. Young-growth thinning acres were reduced in all alternatives except Alternative 2, which did not include young-growth thinning.

The uneven-aged group selection prescription, proposed in Alternative 4, was changed to two-aged patch clearcutting to improve economic and operational feasibility of partial harvest prescriptions for small-sale operators. The two-aged prescription continues to meet wildlife objectives and is a better fit for small sales in Phase 2 areas, where it is primarily used, because it is more feasible to implement with equipment commonly available to small operators. The two-aged system prescribes slightly larger openings (up to 5 acres vs. 2 acres with group selection), and limits disturbance to no more than 40 percent of the unit area during this entry vs. 33 percent under group selection.

New road construction also decreased in all alternatives, primarily because of a shift toward more helicopter harvest. New National Forest System (NFS) road construction was reduced the most, with a number of roads being changed to temporary roads. The amount of road reconstruction was nearly the same.

Proposed old-growth reserve (OGR) modifications did not change in Alternative 3. However, the modified small OGR boundaries in Alternative 4 were adjusted in Value Comparison Units (VCUs) 5820, 5830, and 5950 to better correspond with the interagency team biologically preferred locations and in response to U.S. Fish and Wildlife Service (USFWS) comments.

A Small Sales Alternative was considered in response to public comments on the Draft EIS. It is described in the Alternatives Considered but Eliminated from Detailed Study section.

The descriptions in the Alternatives Considered in Detail section were modified to reflect the changes in the alternatives and updated analyses. Similarly, the numbers in Table 2-1 were also updated.

### Stewardship Projects

The description of stewardship opportunities in Chapter 1 was updated and expanded and specific restoration and enhancement projects under consideration were identified.

## **Changes in Chapter 3 – Environment and Effects**

### ***Issue 1 – Timber Supply and Timber Sale Economics***

- § The volume under contract data for the Tongass has been updated to reflect changes in unit design and silvicultural prescriptions.
- § The discussion of the limited shipment policy has been updated to include the results of the Regional Forester’s annual review of the policy for 2013.
- § Employment and income estimates have been updated to reflect changes in each of the alternatives
- § The Forest Service Financial Efficiency Analysis has been updated to reflect changes in each of the alternatives.

### ***Issue 2 – Old-Growth Habitat LUD Modifications***

- § Added analysis of interior forest habitat, including changes in interior forest included in the OGR system as a result of Alternative 3 and Alternative 4 proposed OGR modifications.
- § Added determinations of which small OGRs provide comparable achievement of Old-growth Habitat Land Use Designation (LUD) goals and objectives.

### ***Issue 3 – Wildlife and Subsistence Use***

- § All analyses were updated to reflect the changes of the alternatives for the units and the roads.
- § An analysis of interior forest habitat for cavity-nesting management indicator species (MIS) and other species was added to enhance the discussion of fragmentation effects.
- § Population trend information was added for each cavity-nesting MIS.
- § An analysis of changes in landscape composition was added for the goshawk.
- § Additional information on the difficulty of detecting goshawks on the Tongass was added.
- § Text discussing migratory deer and information on population trends based on recent deer pellet transect surveys were added.
- § Additional discussion on the limitations of the interagency deer model was added.
- § Additional information on the status of the Game Management Unit (GMU) 2 wolf population has been added based on input from the Alaska Department of Fish and Game (ADF&G).

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### ***Issue 4 – Cumulative Watershed Effects and Fisheries***

Clarifications and modifications were made throughout the sections in response to Draft EIS comments and changes to the alternatives. This resulted in changes to the maps and tables displaying watershed and fisheries data and related effects analysis.

#### ***Soils***

- § Existing detrimental soil disturbance was updated due to updates in mapping of past harvest and road miles.
- § Calculations for soil disturbance were updated based on changes to the proposed alternatives.

#### ***Climate Change***

The climate-change analysis has been expanded to include a brief assessment related to the differences between the no-action and action alternatives.

#### ***Wetlands***

- § Calculations of wetland disturbance were updated based on changes to the proposed alternatives.
- § Results of wetland/road monitoring (Landwehr 2011a) were added to the discussion of effects.

#### ***Botany***

- § Additional rare and sensitive plant surveys were conducted, and the results were incorporated into the analyses.
- § Additional invasive plant surveys were conducted, and the results were incorporated into the analyses.

#### ***Timber and Vegetation***

- § Additional information has been added to the Silviculture Resource Report and Chapter 3 in response to comments concerning overall species composition compared to what is proposed for harvest and the composition of regenerating stands in the project area and relative to Alaska yellow-cedar.

#### ***Transportation***

- § Tables and text were updated to reflect the road changes for each alternative.

#### ***Recreation***

- § The Recreation Opportunity Spectrum (ROS) land classification system analysis has been updated to reflect changes for each alternative.

## **Scenery**

- § Tables and text were updated to reflect the unit and road changes for each alternative.

## ***Inventoried Roadless Areas and Wilderness***

- § The Area of Influence analysis for Inventoried Roadless Areas (IRAs) has been updated to reflect changes in the proposed alternatives. This analysis assesses the potential impacts on IRAs from timber harvest and road construction in areas outside the IRA boundaries, but in the immediate vicinity.

## ***Wild and Scenic Rivers***

- § The acres of harvest and thinning within the Recreational River LUD have been updated to reflect changes in the proposed alternatives.

## **Alternative Development**

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An alternative is a set of activities designed to accomplish the goals described in the purpose and need section of Chapter 1. The proposed action (Alternative 2) is one of a number of possible approaches to accomplishing these goals by harvesting timber in the project area. It was developed during the early planning phase of this project. The planning phase included completing a Logging System and Transportation Analysis (LSTA) for the project area. During this analysis, the suitable timber in the project area was divided into logical harvest settings. These groups of settings were used to create the harvest unit pool. In addition, the roads needed to access the harvest unit pool were mapped. These units and the roads were surveyed in 2010 and 2011. During this field verification, the shape of the units and the locations of roads were modified to reflect on-the-ground conditions and many units and roads were modified or dropped from consideration because they were determined to be inconsistent with the Tongass Land and Resource Management Plan (Forest Plan) (e.g., they had unstable soils).

The interdisciplinary team (IDT) considered the significant issues and identified various alternatives to the proposed action to provide a reasonable range of options for meeting the purpose and need of this project. In addition to addressing the issues identified during scoping (see Chapter 1), these alternatives were designed to meet Standards and Guidelines defined in the Forest Plan (USDA Forest Service 2008a) and applicable laws. Within this range, various combinations of alternatives can be considered in determining the selected alternative.

In addition to units and roads modified or dropped for reasons related to consistency with the Forest Plan, in early 2011 it was determined that all units and roads would be in the roaded landbase outside 2001 IRAs. As a result of using the roaded landbase outside roadless areas, exchanging the roaded portions of small Old-Growth Habitat LUD polygons (OGRs) for development LUDs in roadless areas was investigated. In order to maximize available timber, the feasibility of modifying the OGRs to be entirely within the

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roadless areas and still meet Forest Plan criteria was investigated. Additional field work was conducted to field verify the shape and location of these units and roads and their consistency with Forest Plan standards and guidelines. Alternatives were developed that included harvest units and new roads in these roaded portions of Forest Plan OGRs.

In addition, an interagency team (including biologists from the Forest Service, USFWS, and ADF&G) reviewed the locations of the OGRs with regard to roadless areas and their biologically preferred locations. As a result, modifications to OGR locations were identified and additional units and roads were added to the unit pool. An alternative was developed that incorporated the biologically preferred locations for OGRs.

Following Draft EIS development, the conducting of additional field surveys, and receipt of public comments, additional refinements were made to each of the alternatives. As noted above, unit and road changes were made to improve economics, improve logging feasibility, adjust legacy, or address new stream information or other resource concerns. Some units and roads were dropped and some were added in each alternative to improve how well each alternative addressed its theme. Other changes to the alternatives were made as a result of public comments on the Draft EIS.

### Alternatives Considered in Detail

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The Forest Service developed five alternatives, including the no-action, the proposed action, and three action alternatives (alternatives to the proposed action). These action alternatives were developed in response to significant issues and to provide a reasonable range of alternatives.

#### Alternative 1 (No Action)

Under the no-action alternative, no timber harvest or road construction would be implemented to accomplish Big Thorne Project goals. Current management plans would continue to guide management of the project area. Vegetation management activities including pre-commercial thinning of young stands (both riparian and wildlife thinning) would continue. Road maintenance, culvert replacement, and timber micro-sales would continue, and road closures prescribed by the Access Travel Management Plan would continue as funding allows. In addition, at some time in the future, a new timber project could be developed in the project area that incorporates commercial thinning of young-growth and/or old-growth harvest. A large-scale, color map of the existing conditions (Alternative 1) showing existing roads, existing productive old growth, and past harvest in the project area is provided in the map packet and on the CD accompanying this EIS.

Alternative 1 is analyzed to provide a baseline for evaluation of the effects associated with the action alternatives. Unlike the action alternatives, Alternative 1 does not meet the purpose and need for this project because it fails to address the timber supply and economics concern.

#### Alternative 2 (Proposed Action)

Alternative 2 meets the purpose and need of this project and balances short-term timber supply/economic aspects (Issue 1) with the wildlife habitat/subsistence (Issue 3) and

watershed issues (Issue 4). It completely avoids harvest or road construction in IRAs. This alternative implements Forest Plan direction and works toward attaining its goals and achieving its objectives. A large-scale, color map for Alternative 2 showing proposed roads and harvest units along with existing roads and past harvest is provided in the map packet and on the CD accompanying this EIS.

**Timber Harvest:** This alternative would produce approximately 105 million board feet (MMBF) of old-growth sawtimber, plus 16 MMBF of utility volume. It includes clear-cutting (even-aged management) and partial harvest (uneven-aged management) silvicultural prescriptions, using cable, shovel, and helicopter logging systems to harvest old-growth timber from approximately 5,121 total acres (including 24 percent partial harvest). Helicopter-yarding would be conducted on approximately 37 percent of the acres. It completely avoids harvest or road construction in IRAs. No thinning of young growth is included in this alternative. No changes to OGRs are proposed. Old-growth harvest would include 593 acres in Phase 2 lands of the Timber Sale Program Adaptive Management Strategy.

Per the wildlife Forest Plan Standards and Guidelines, legacy forest structure is incorporated into harvest units greater than 20 acres in VCUs 5790, 5810, 5830, 5840, 5850, 5860, and 5972. Acres and volumes presented in this document account for reductions due to legacy areas within units. Preliminary locations for legacy are shown on the unit card maps in Appendix B of the Draft EIS. These locations were reviewed between the Draft EIS and Final EIS and refined in many cases; the Final EIS unit cards are located in the project record.

**Roads:** Alternative 2 proposes approximately 32 miles of new road construction (including 5 miles constructed on previously decommissioned road beds). Most of the new roads would be temporary and would be decommissioned after timber harvest and hauling is completed; 8 miles of the new roads would be system roads and would remain seasonally open for 1 to 5 years after harvest to allow firewood gathering and other incidental uses, prior to being stored. Approximately 18 miles of existing stored roads would be reconstructed; these would also remain open for 1 to 5 years after harvest prior to being stored again.

## Alternative 3

Alternative 3 was developed to address the timber supply and economics issue (Issue 1). This alternative would provide the most timber volume of all alternatives considered in detail. Under this alternative, unit design is such that volume and economic efficiency are emphasized within Forest Plan constraints. It completely avoids harvest or road construction in IRAs. Alternative 3 meets the purpose and need of this project, implements Forest Plan direction, and works toward attaining its goals and achieving its objectives.

Alternative 3 includes modifications to some of the small OGRs in the project area. These modifications relocate portions of the small OGRs to be within the 2001 Roadless Rule IRAs as much as possible from the current locations where there are existing roads. These roaded portions of the existing OGRs would then be allocated to LUDs where timber harvest would be allowed, i.e., Timber Production, Modified Landscape, and Scenic Viewshed (see Issue 2 in Chapter 1). Determination of which LUD to allocate to each



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individual parcel is based on the adjacent LUDs and Visual Priority Travel Routes and Use Areas.

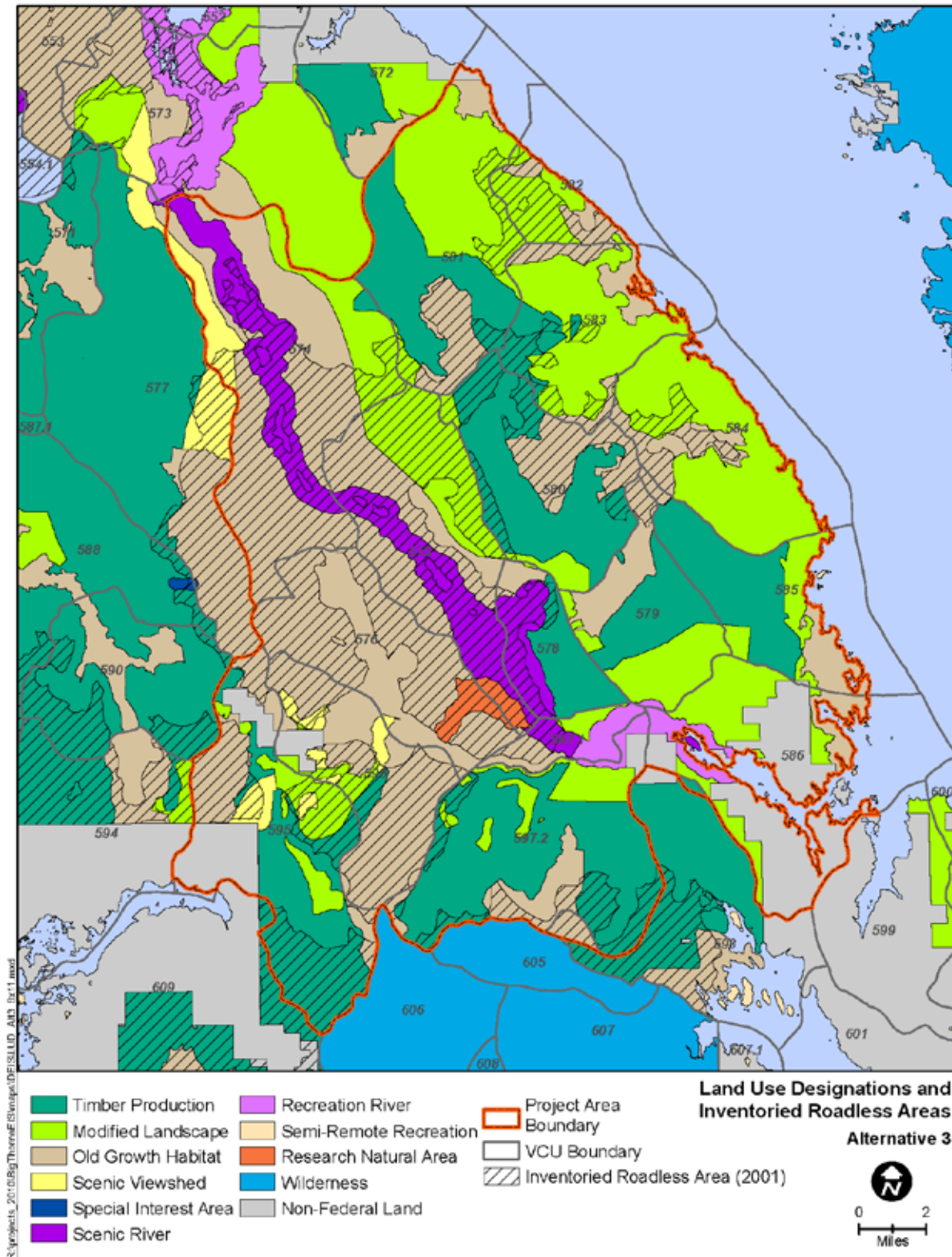
Commercial thinning of older young-growth stands on medium to high productivity sites was incorporated into Alternative 3. This thinning would provide more volume and respond to the emphasis on transitioning to young-growth harvest.

The LUD modifications associated with the changes to OGRs are displayed in the revised LUD map for Alternative 3 in Figure 2-1. The net change in the area of Old-growth Habitat LUD within the project area would be an increase of about 590 acres (1 percent). Among the development LUDs, Timber Production would decrease by 1,104 acres (2 percent), Modified Landscape would increase by 886 acres (2 percent), and Scenic Viewshed would decrease by 372 acres (8 percent). A large-scale, color map for Alternative 3 showing proposed roads and harvest units along with existing roads and past harvest is provided in the map packet and on the CD accompanying this EIS.

**Timber Harvest:** This alternative would produce approximately 155 MMBF of old-growth and young-growth sawtimber, plus 21 MMBF of utility volume. The majority of the harvest would be from old-growth timber (approximately 140 MMBF sawtimber) on approximately 7,120 acres (including 31 percent partial harvest), after taking legacy areas within units into account. It includes clear-cutting (even-aged management) and partial harvest (uneven-aged management) silvicultural prescriptions, using conventional cable, shovel, and helicopter logging systems. Helicopter yarding would be used on 42 percent of the old-growth acres. In addition, Alternative 3 includes commercial thinning of 50 to 65 year-old young growth using ground and cable logging systems on approximately 2,299 acres (including 50 acres in small OGRs), producing approximately 15 MMBF (based on volume at time of harvest,  $\geq$  50 years old). Old-growth harvest would include 839 acres in Phase 2 lands of the Timber Sale Program Adaptive Management Strategy.

Per the wildlife Forest Plan Standards and Guidelines, legacy forest structure is incorporated into harvest units greater than 20 acres in VCUs 5790, 5810, 5830, 5840, 5850, 5860, and 5972. Acres and volumes presented in this document account for reductions due to legacy areas within units. Preliminary locations for legacy are shown on the unit card maps in Appendix B of the Draft EIS. These locations were reviewed between the Draft EIS and Final EIS and refined in many cases; the Final EIS unit cards are located in the project record.

**Roads:** This alternative proposes approximately 51 miles of new road construction (including 14 miles constructed on previously decommissioned road beds). Most of the new roads would be temporary and would be decommissioned after timber harvest and hauling is completed; 14 miles of new roads would be system roads and would remain seasonally open for 1 to 5 years after harvest to allow for firewood gathering and other incidental uses, prior to being stored. Approximately 36.7 miles of existing stored roads would be reconstructed; these would also remain open for 1 to 5 years after harvest prior to being stored again.



**Figure 2-1.** Alternative 3 LUD Map and Inventoried Roadless Areas after OGR Modifications (compare with Figure 1-2, the Existing LUD Map)

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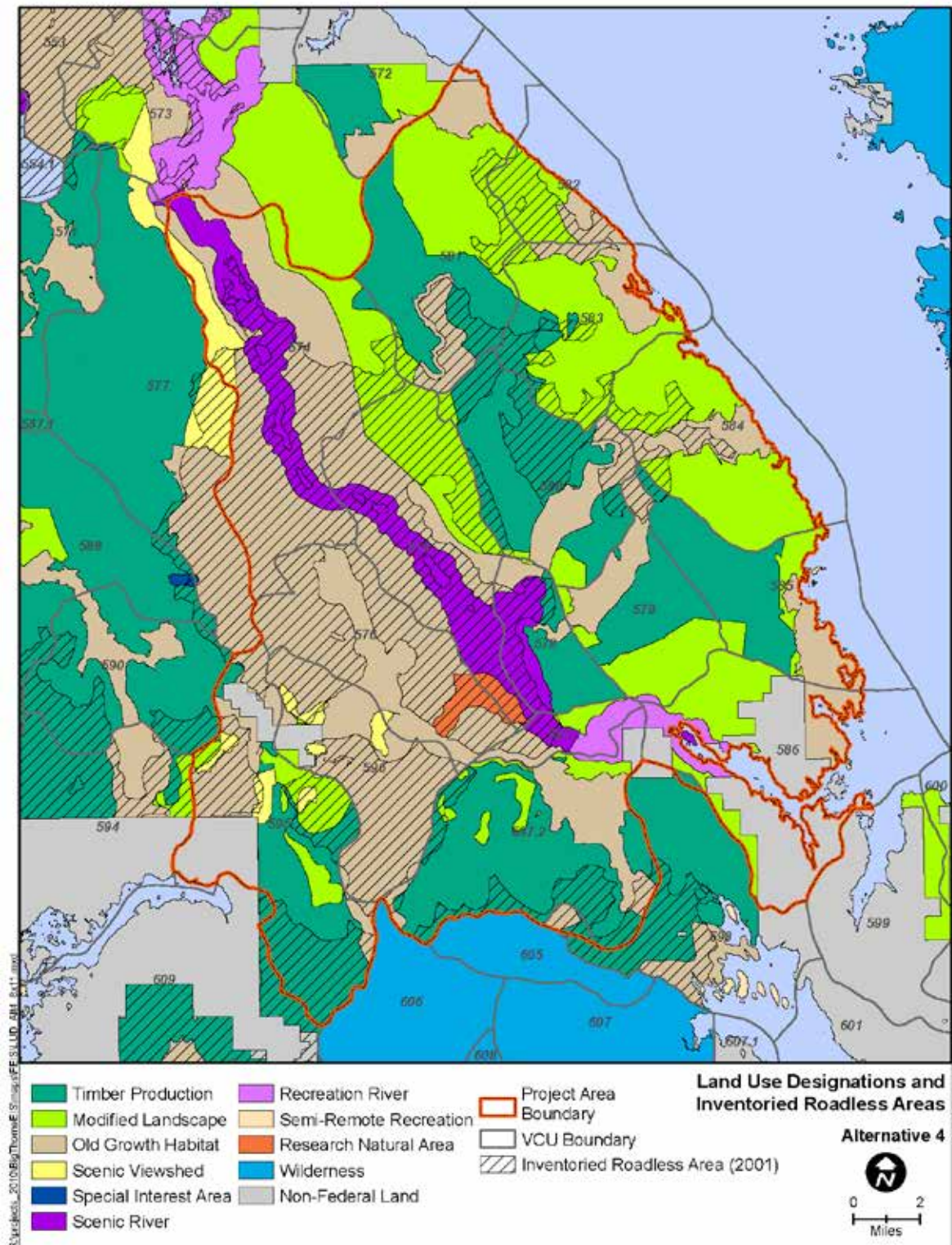
### Alternative 4

Alternative 4 emphasizes the wildlife and subsistence issue (Issue 3), but also considers each of the other three issues. It emphasizes landscape connectivity and the protection of key wildlife travel corridors and minimizing impacts to sensitive plants and wildlife species, including wolves, goshawks, black bears, deer, and marten. Under this alternative, impacts to biodiversity and wildlife were minimized by selecting harvest methods and prescriptions that would have a lighter touch on the landscape (i.e., resulting in less old-growth removal and less road construction) and deferring or modifying boundaries of proposed units that could impact habitat connectivity or impact sensitive plant populations. Alternative 4 includes commercial thinning as a mechanism for achieving desired timber volumes while having the benefit of improving habitat quality in closed canopy stands. It completely avoids harvest or road construction in IRAs. Alternative 4 meets the purpose and need of this project, implements Forest Plan direction, and works toward attaining its goals and achieving its objectives.

A component of this alternative is the incorporation of the biologically preferred alternative for small OGRs in the project area as recommended by the interagency review team (including biologists from the Forest Service, USFWS, and ADF&G). This resulted in portions of some small OGRs being allocated to a Modified Landscape or Timber Production designation, as appropriate, based on the adjacent LUDs and viewshed boundaries. The net change in the area of Old-growth Habitat LUD within the project area would be an increase of about 4,270 acres (6 percent). Among the development LUDs, Timber Production would decrease by 1,037 acres (2 percent), Modified Landscape would decrease by 2,590 acres (4 percent), and Scenic Viewshed would decrease by 643 acres (15 percent). Modifications to the OGRs in VCUs 5820, 5830, and 5950 occurred after the Draft EIS was published to more closely match the biologically preferred alternative and based on comments by USFWS. The LUD modifications associated with these changes to OGRs are displayed in the revised LUD map for Alternative 4 in Figure 2-2. A large-scale, color map for Alternative 4 showing proposed roads and harvest units along with existing roads and past harvest and OGR modifications, is provided in the map packet and on the CD accompanying this EIS.

**Timber Harvest:** This alternative would produce approximately 75 MMBF of old-growth and young-growth sawtimber, plus 10 MMBF of utility volume. It would harvest approximately 63 MMBF of old-growth sawtimber on 4,757 acres (including 79 percent partial harvest), after taking legacy areas within units into account. It includes clear-cutting (even-aged management) and partial harvest (uneven-aged and two-aged management) silvicultural prescriptions, using cable, shovel, and helicopter logging systems. Helicopter yarding would be used on 78 percent of the old-growth acres. In addition, Alternative 4 includes commercial thinning of young growth using ground and conventional logging systems on approximately 1,888 acres of 50- to 65-year-old stands (including 81 acres in small OGRs), producing approximately 12 MMBF of sawtimber (based on volume at time of harvest,  $\geq 50$  years old). Old-growth harvest would include 487 acres of mostly partial harvest (uneven-aged and two-aged management) in Phase 2 lands of the Timber Sale Program Adaptive Management Strategy.





**Figure 2-2.** Alternative 4 LUD Map and Inventoried Roadless Areas after OGR Modifications (compare with Figure 1-2, the Existing LUD Map)

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Per the wildlife Forest Plan standards and guidelines, legacy forest structure is incorporated into harvest units greater than 20 acres in VCUs 5790, 5810, 5830, 5840, 5850, 5860, and 5972. Acres and volumes presented in this document account for reductions due to legacy areas within units. Preliminary locations for legacy are shown on the unit card maps in Appendix B of the Draft EIS. These locations were reviewed between the Draft EIS and Final EIS and refined in many cases; the Final EIS unit cards are located in the project record.

**Roads:** This alternative proposes approximately 11 miles of new road construction (including 8 miles constructed on previously decommissioned road beds). Most of the new roads would be temporary and would be decommissioned after timber harvest and hauling is completed; 0.2 mile would be system roads and would remain seasonally open for 1 to 5 years to allow for firewood gathering and other incidental uses, prior to being stored. Approximately 19 miles of existing stored roads would be reconstructed; these would also remain open for 1 to 5 years after harvest prior to being stored again.

### Alternative 5

Alternative 5 addresses watershed effects (Issue 4) and other issues by minimizing road construction, road-stream crossings, ground-based logging, and reducing harvest in watersheds with high levels of harvest within the past 30 years. In general, it gives greater emphasis to uneven-aged management (primarily with helicopter yarding) compared with even-aged management, to further lessen watershed effects. Where even-aged management was being considered, the IDT also considered the potential watershed effects associated with topography and soils, location within the watershed, amount of past watershed harvest, and road and stream crossing requirements, and existing road density, prior to selecting that method. Given these primary considerations, this alternative attempts to maximize timber supply. Alternative 5 includes commercial thinning units in older young-growth stands where thinning could improve watershed function, benefit wildlife, and contribute to harvest volume.

Alternative 5 completely avoids harvest or road construction in IRAs and does not adjust OGR boundaries. Alternative 5 meets the purpose and need of this project, implements Forest Plan direction, and works toward attaining its goals and achieving its objectives.

A large-scale, color map for Alternative 5 showing proposed roads and harvest units along with existing roads and past harvest is provided in the map packet and on the CD accompanying this EIS.

**Timber Harvest:** This alternative would produce approximately 101 MMBF of old-growth and young-growth sawtimber, plus 13 MMBF of utility volume. It includes clear-cutting (even-aged management) and partial harvest (uneven-aged management) silvicultural prescriptions, using cable, shovel, and helicopter logging systems to harvest approximately 89 MMBF of old-growth sawtimber on 5,452 total acres (including 55 percent partial harvest), after taking legacy areas within units into account. Helicopter yarding would be conducted on approximately 69 percent of the acres. In addition, this alternative includes commercial thinning of older young-growth stands (50 to 65 years old) using ground and conventional logging systems on approximately 1,850 acres (including 77 acres in small OGRs), producing approximately 12 MMBF of sawtimber

(based on volume at time of harvest,  $\geq 50$  years old). No changes to OGRs are proposed in this alternative. Old-growth harvest would include 525 acres in Phase 2 lands of the Timber Sale Program Adaptive Management Strategy.

Per the wildlife Forest Plan standards and guidelines, legacy forest structure is incorporated into harvest units greater than 20 acres in VCUs 5790, 5810, 5830, 5840, 5850, 5860, and 5972. Acres and volumes presented in this document account for reductions due to legacy areas within units. Preliminary locations for legacy are shown on the unit card maps in Appendix B of the Draft EIS. These locations were reviewed between the Draft EIS and Final EIS and refined in many cases; the Final EIS unit cards are located in the project record.

**Roads:** This alternative proposes approximately 17 miles of new road construction (including 8 miles constructed on previously decommissioned road beds). Most of the new roads would be temporary and would be decommissioned after timber harvest and hauling is completed; 0.8 mile would be system roads and would remain seasonally open for 1 to 5 years to allow for firewood gathering and other incidental uses, prior to being stored. All new construction would begin from the existing road system. Approximately 17.5 miles of existing stored roads would be reconstructed; these would also remain open for 1 to 5 years after harvest prior to being stored again.

## Identification of the Preferred Alternative

In the Draft EIS, no alternative was identified by the IDT as the preferred alternative. In the Final EIS, Alternative 5 is identified by the IDT as the preferred alternative. This was based on the environmental analysis and public and agency comments received. The responsible official may select this alternative, another alternative, or a modification of one of the alternatives.

## Design Criteria and Mitigation Common to all Action Alternatives

All alternatives are designed to be consistent with the Forest Plan and all applicable Forest Plan standards and guidelines have been incorporated into the design of the proposed units and alternatives. While some alternatives have been designed to provide a greater measure of protection than is required by the Forest Plan for some resources, such as limiting road construction to reduce the impacts to sensitive watersheds (see Alternative 5), all alternatives were designed to meet Forest Plan standards and guidelines for these and all other resources. Additional direction comes from applicable laws and Forest Service manuals and handbooks.

The analysis documented in this Final EIS discloses the possible adverse impacts that may occur from implementing the actions proposed under each alternative. Timber harvest and road construction design measures have been formulated to mitigate or reduce these impacts. These measures were guided by direction from the Tongass Forest Plan previously described (in this chapter and in Chapter 1). Resource specialists from the IDT used on-the-ground inventories, computer (geographic information system) data, and aerial photographs to

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prepare unit cards for each harvest unit in the unit pool for the project. Cards are also prepared for each segment of system road.

Site-specific descriptions and resource considerations for each potential harvest unit are included as unit cards (see unit card introduction in Appendix B of the Draft EIS). Unit cards, along with supporting documents (e.g., detailed silvicultural prescriptions), serve as the design narrative for implementation of this project after the National Environmental Policy Act (NEPA) process is complete. Design elements for the construction of new system roads are described in detail in the road cards (see Appendix C in the Draft EIS). Resource specialists have included site-specific concerns on the cards and have described how these concerns would be mitigated (if not completely avoided) in the design of each unit and road segment. Resource concerns and mitigation measures may be refined further during final layout.

### ***Road Management***

All temporary roads would be decommissioned after timber harvest. All new system roads and reconstructed ML1 stored roads would remain open an additional 1 to 5 years to allow for firewood removal, regeneration surveys, microsales, and incidental uses, with seasonal closures between November 30 and May 1 (as designated on the Motor Vehicle Use Map). At the end of 1 to 5 years, all new system roads and reconstructed ML1 stored roads would be designated as not for public motor vehicle use (unless they are designated as motorized trails) and would be placed in a self-maintaining hydrologic status (stored).

### ***Windthrow and Reasonable Assurance of Windfirmness Buffers***

Windthrow can affect trees in riparian areas that are included in riparian management area (RMA) buffers for fish habitat or water quality protection. In addition to mitigation measures found on unit and road cards, each harvest prescription considers the addition of a reasonable assurance of windfirmness (RAW) buffer to each Forest Plan minimum RMA buffer along Class I, II, and III streams. This RAW buffer provides additional protection to RMA buffers that may be affected by windthrow.

As the first step in this consideration for RAW buffers, the IDT conducted a review of each stream using maps and local knowledge of the wind patterns for the area, and those streams recommended for field RAW review were identified. The unit cards identify the buffers that need additional review for windfirmness. These RAW buffers would be applied with interdisciplinary consultation during sale layout on a case-by-case basis, because some areas would benefit from these additional buffers, while others would have no need for this additional measure, which is most often apparent at the time of implementation.

In addition to RAW buffers along streams, some units include visual buffers for screening views from visual priority routes. In the unit cards for these units, it is stated that these buffers also need to be reviewed for RAW buffers during implementation.

## **Legacy Forest Structure**

The intent of the Legacy Forest Structure Standard and Guideline is to ensure that sufficient residual trees, snags, and clumps of trees remain in timber harvest units within VCUs that have had concentrated past timber harvest activity and are at risk for not providing the full range of matrix functions, in order to meet the intent of the conservation strategy while providing flexibility to address on-the-ground implementation issues. In the project area, VCUs 5790, 5810, 5830, 5840, 5850, 5860, and 5972 require legacy forest structure. As a result, 30 percent of the original reconnaissance area is incorporated into legacy areas for harvest units greater than 20 acres. The reconnaissance area is defined as the original LSTA boundary prior to field verification. Preliminary legacy locations are shown on the unit cards and will be included on the unit cards for the Selected Alternative in the decision. Any operational issues for the final on-the-ground legacy location will be taken into account during implementation. Acres and volumes presented in this document account for reductions due to legacy areas within units. Legacy placement in a unit sometimes varied by alternative, depending on the logging system, silvicultural prescription, and alternative emphasis.

## **Invasive Plants**

There will be mitigating actions to reduce the risk of increasing invasive plant introduction and spread. Mitigation measures include cleaning of equipment that is imported from outside Prince of Wales Island, use of approved rock sources, treatment of new introductions of high-priority invasives, and control of specific existing infestations in the project area (see Invasive Species in Chapter 3).

## **Sensitive Plants**

Because of the relative abundance of the lesser round-leaved orchid (*Platanthera orbiculata*) in the project area and the potential degree of effects from Big Thorne Project actions, a separate project monitoring plan will be developed. This plan will serve to track the actual direct and indirect effects that occur and compare them with the predicted effects in the Final EIS and Biological Assessment. It will also serve as an early warning if effects are larger than expected.

A sensitive lichen population is located near existing NFS road 300000 at MP 24.8. Dust dispersal from the road surface is expected to increase with intensified road use, and could have negative impacts on the sensitive species. Consideration will be given to implementing the contract provision clause for the application of water to the road surface within 300 feet of this population to reduce dust, if the amount of dust is expected to increase with the use of the road for a particular contract. Frequency of water application would be dependent on the road use intensity and weather conditions.

## **Watersheds and Fisheries**

Rock sources will be examined for potential acid rock drainage (ARD) and only sources approved by the Forest Service will be used. In areas where full-bench construction is anticipated and the underlying bedrock (containing pyrite) may be mineralized, a Forest



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Service geologist will provide on-site inspection during excavation and construction to identify potential mineralized zones. If rock with potential for ARD is disturbed, mitigation will include lining the upslope ditch with limestone aggregate to neutralize run-off from potential mineralized zones exposed during full bench construction. See the discussion of Water Quality in Issue 4: Cumulative Watershed Effects in Chapter 3 for a more-detailed discussion.

In order to minimize any effects of harvest on stream flow in the North Big Salt Lake (Steelhead Creek) subwatershed, annual harvest levels will be limited to ensure that less than 20 percent of the subwatershed is in previously harvested areas that are 30 years old or younger at any point in time. To do this, harvest will be limited as follows:

- § Up to 151 acres can be harvested in 2015, and no harvest is allowed prior to 2015;
- § Up to 226 additional acres can be harvested in 2016 (plus any remainder from 2015);
- § Up to 114 additional acres can be harvested in 2017 (plus any remainder from 2015 and 2016);
- § Up to 171 additional acres can be harvested in 2018 (plus any remainder from 2015, 2016, and 2017);
- § No limitation in 2019 or later.

### ***Marine Access Facility (MAF)***

A marine access facility (MAF) is used to transfer materials and equipment from land to saltwater or vice versa and that contains a structure such as a mooring buoy, dock, log transfer facility (LTF), boat ramp, or a combination of these. An LTF is used to transfer logs and timber products from land-based transportation forms to water-based transportation forms (or vice versa). Two existing Forest Service LTFs may be used for the timber sale. These are located in Coffman Cove and Thorne Bay.

### ***Road Management Objectives***

All Big Thorne alternatives have been analyzed using the same road management objectives for existing NFS roads as the Prince of Wales Access Travel Management Plan Environmental Assessment analysis.

### ***Sort Yards***

The Forest Service has a log sorting facility at Thorne Bay that may be used for this project. Sorting could also occur at other existing yards on Prince of Wales Island.

### ***Best Management Practices and Monitoring***

Best management practices (BMPs) are methods, measures, or practices to prevent or reduce water pollution, including but not limited to structural and non-structural controls, operation and maintenance procedures, other requirements and scheduling and distribution of activities (Forest Service Handbook 2509.22, Region 10 Soil and Water Conservation

Handbook [USDA Forest Service 2006a]). They are the result of extensive efforts between the Forest Service and the State of Alaska to identify practices that will ensure that timber harvest activities minimize soil erosion and protect aquatic habitat. BMPs as applied to unit harvest and roads are in the unit and road cards (see Draft EIS Appendices B and C for the Draft EIS unit and road cards, the project record for Final EIS unit and road cards, and the Record of Decision appendices for selected alternative unit and road cards). The Forest Service recently issued National Core BMPs (USDA Forest Service 2012a). Directives for using these BMPs are currently in development. The Big Thorne Final EIS will include the National Core BMPs and the project will implement the most up-to-date BMP guidance.

## ***Monitoring***

Monitoring activities can be divided into Forest Plan monitoring and project-specific monitoring. The National Forest Management Act requires that national forests monitor and evaluate their forest plans (36 Code of Federal Regulations [CFR] 219.11). Chapter 6 of the Forest Plan includes the monitoring and evaluation activities to be conducted as part of Forest Plan implementation.

The Forest Service is developing a National BMP Monitoring Program that addresses implementation and effectiveness of BMPs. Directives for using the monitoring protocols are expected in 2013. The Tongass National Forest has tested the national protocols for timber harvest and road activities and has adopted them as part of Forest Plan Monitoring. Results will be reported in the Annual Monitoring and Evaluation Report.

### **Implementation (Forest Plan) Monitoring**

Implementation monitoring assesses whether the project was implemented as designed and whether or not it complies with the Forest Plan. The information on the unit and road cards for the project decision is used to prepare the timber sale on the ground. Any adjustments are documented in a Change Analysis document and reviewed to see if a further NEPA analysis is needed.

The sale administrators and road inspectors ensure that the prescriptions contained on the unit and road cards, and the unit silvicultural prescriptions, are incorporated into contract documents; they then monitor performance relative to contract requirements. Input by resource staff specialists, such as fisheries biologists, soil scientists, hydrologists and engineers, is regularly requested during this implementation monitoring process. These specialists provide technical advice when questions arise during project implementation.

Possible effects to heritage resources are monitored as specified in the Programmatic Agreement (2002) with the State Historic Preservation Office by selecting areas of direct impact during and/or after actual ground disturbance.

### **Project-specific Effectiveness Monitoring**

Project-specific effectiveness monitoring is designed to determine how well specific design features or mitigation measures work in protecting natural resources and their beneficial uses. Monitoring for the success of prescription implementation would take place through required reforestation surveys. Monitoring young-growth condition class

## 2 Alternatives

would take place through periodic field surveys and treatment needs assessment. Monitoring for new infestations of invasive species and monitoring of infestation treatments and monitoring of the lesser round-leaved orchid (sensitive species) would occur during/after project implementation.

The types of monitoring listed above are used to determine if the measures were implemented and if they are effective in mitigating the effects of the project or if they need to be revised. Information derived from monitoring can be used to develop improved or additional treatments to ensure that these safeguards will be effective in the future.

### Alternatives Considered but Eliminated from Detailed Study

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Federal agencies are required by NEPA to rigorously explore and objectively evaluate all reasonable alternatives and to briefly discuss the reasons for eliminating any alternatives that were not developed in detail (40 CFR 1502.14). Public comments received in response to the proposed action provided suggestions for alternative methods for achieving the purpose and need. Some of these alternatives may have been outside the scope of this project, duplicative of the alternatives considered in detail, or determined to be components that would cause unnecessary environmental harm. Therefore, a number of alternatives were considered but dismissed from detailed consideration for reasons summarized below.

#### No New Roads Alternative

The IDT considered a No New Roads Alternative but decided that a Minimal New Roads Alternative would satisfy the objectives of this alternative, while coming closer to satisfying the purpose and need. This alternative would minimize road construction and the number of fish-stream crossings, while maximizing harvest through helicopter-based logging. It would not restrict the reconstruction of roads that are in storage or the construction of new roads on previously decommissioned roadbeds. This alternative emphasizes aspects of the cumulative watershed effects and wildlife and subsistence issues and specifically responds to scoping comments by limiting changes in the surface area covered by roads within project area watersheds and by limiting any increase in wildlife analysis area (WAA) road densities.

The following alternative design criteria were used to develop an initial version of this alternative:

- § Minimize road construction throughout the project area; very short spur roads (<0.1 mile) are allowed;
- § Minimize the number of new road-stream crossings; and
- § Maintain timber volume by converting cable or shovel settings requiring new roads to helicopter settings in units within 1 mile of existing roads.

**Timber Harvest:** This alternative includes mostly clear-cutting and partial cut (uneven-aged) management prescriptions using conventional cable and shovel logging systems and helicopter yarding to harvest approximately 100 MMBF of timber on about 5,800 total

acres. Helicopter yarding would be conducted on approximately 4,500 of these acres (77 percent). No harvest would occur within IRAs.

**Roads:** This alternative proposes to construct less than 2 miles of new road. These short spurs would be temporary roads and would be decommissioned after timber harvest and hauling is completed. All new construction would begin from the existing road system. Approximately 8 miles of existing stored roads would be reconstructed.

While the Minimal Roads alternative responds to watershed and wildlife issues associated with road densities, the high percentage of helicopter harvest indicates that the economics of this alternative would be very poor. It was decided that Alternatives 4 and 5 would be modified to reduce road densities further and increase the percentage of helicopter harvest, and due to the poor economics, the Minimal Roads alternative was moved into the Alternatives Considered, but not in Detail category.

## Modification of Small and Large OGRs

This alternative is the same as Alternative 3 in all aspects, except that it also included modification of the large OGR in the Honker Divide area. It was developed to address the timber supply and economics issue. This alternative would increase the amount of available timber by modifying the roaded portions of both small and large OGRs.

Under this alternative, the large OGR would be reduced from approximately 178,000 acres in size to 163,000 acres in size (about 92 percent of original acres). The amount of productive old growth inside the large OGR would be reduced from approximately 92,000 acres to approximately 85,000 acres (about 92 percent of original acres). Both of these figures are well above the size criteria for large OGRs. In addition, there is potential for the addition of acreage from within adjacent roadless areas.

The total volume produced by this alternative was estimated at 233 MMBF. Approximately 208 MMBF would come from harvest of old growth and approximately 25 MMBF would be derived from young-growth thinning. The alternative would require construction of about 81 miles of new road and reconstruction of about 58 miles of roads that are currently in storage.

Because of the high importance and spatial limitations for large and medium OGRs, as designated under the Tongass Conservation Strategy, in addition to the general recognition that the large Honker Divide OGR may be the most important OGR on northern Prince of Wales Island, this alternative was not carried forward for detailed analysis.

## Yellow-Cedar Alternative

In response to public comments, related to yellow-cedar and yellow-cedar decline, an alternative that would avoid the harvest of healthy yellow-cedar stands was considered.

Yellow-cedar is commonly found in mixed-conifer stands and as a component of productive old growth (POG) within the project area. Over 50,000 acres of POG occurs within non-development LUDs in the project area. This does not include the POG acreage in beach and estuary buffers, riparian buffers, and other POG identified as unsuitable for

## 2 Alternatives

timber production by the Forest Plan. No timber harvest would occur in these areas. In addition, yellow-cedar is a component of many stands of unproductive old growth, which is also not subject to timber harvest. Therefore, because of the large amount of yellow-cedar protection provided by the Forest Plan and by the habitats it occurs in, it was not believed to be necessary to have an alternative that avoids healthy stands and this alternative was not carried forward for detailed analysis.

### **Small Sales Alternative**

In response to public comments, an alternative consisting solely of small sales was considered but not carried forward for detailed analysis for the following reasons.

The timber sale volume in any action alternative may contribute to the supply of small or large timber sale volume. Construction of new roads in larger sales can also benefit small timber sale and micro-sale operators by increasing access to other roadside timber volume. The extent of small sale opportunities is directly correlated to the total harvest volume and more specifically to the volume proposed for harvest using conventional logging systems. Generally, alternatives with a higher volume of timber harvest yield more options to create opportunities for a variety of purchasers.

The volume and species composition of individual timber sale offerings from a project is determined at the time of implementation. The small sales program on Prince of Wales Island typically focuses on offerings with less expensive conventional yarding methods, little to no road construction, and no barging or rafting.

Additionally, an alternative solely designed to provide timber for small sales was determined not to be consistent with the project's purpose and need to contribute to a long-term supply of economic timber for the timber industry on Prince of Wales Island and on the Tongass National Forest in general (including both large and small operators), in a manner that is consistent with the multiple-use goals and objectives of the Tongass Forest Plan. Finally, acreage within Phase 2 lands under any action alternative is currently only available for micro and small sales or salvage sales. Therefore, a small sales alternative was not considered necessary to evaluate in detail and was dropped from further analysis.

## Comparison of Alternatives

This section compares outputs and provides a summary of the effects of each alternative in terms of the significant issues. Table 2-1 presents a direct comparison of the alternatives. This table is summarized from Chapter 3, which should be consulted for a full understanding of these and other environmental consequences.

**Table 2-1.** Comparison of Alternatives by Issue

Indicator	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
<b>ISSUE 1: TIMBER SUPPLY AND TIMBER SALE ECONOMICS</b>					
<b>Timber Volume Estimates (MMBF)</b>					
<b>Sawlog (Net) Volume by Species</b>					
Sitka Spruce	0	26.0	42.2	22.2	28.0
Western Hemlock	0	53.0	76.5	37.8	50.6
Western Redcedar	0	18.6	26.1	10.0	15.9
Alaska Yellow-Cedar	0	7.4	10.0	4.8	6.2
<b>Total Old Growth Sawlog Volume</b>	<b>0</b>	<b>105.0</b>	<b>139.8</b>	<b>62.6</b>	<b>88.6</b>
<b>Total Young Growth Sawlog Volume</b>	<b>0</b>	<b>0.0</b>	<b>15.0</b>	<b>12.3</b>	<b>12.1</b>
<b>Total Sawlog Volume</b>	<b>0</b>	<b>105.0</b>	<b>154.8</b>	<b>74.8</b>	<b>100.6</b>
<b>Total Utility Volume</b>	<b>0</b>	<b>16.1</b>	<b>20.9</b>	<b>9.6</b>	<b>13.4</b>
<b>Total Volume (Sawlog + Utility)</b>	<b>0</b>	<b>121.1</b>	<b>175.7</b>	<b>84.4</b>	<b>114.1</b>
<b>Acres of Harvest by Logging System and Prescription (acres)</b>					
<b>Old-Growth (acres)</b>					
Shovel, Even-aged harvest	0	1,875	2,338	405	1,068
Shovel, Uneven-aged harvest	0	0	0	9	0
Shovel, Two-aged harvest	0	0	0	292	0
Cable, Even-aged harvest	0	1,341	1,763	305	627
Cable, Two-aged harvest	0	0	0	26	0
Helicopter, Even-aged harvest	0	699	836	272	758
Helicopter, Uneven-aged harvest	0	1,205	2,182	3,440	2,999
Helicopter, Two-aged harvest	0	0	0	8	0
<b>Subtotal Even-aged Harvest</b>	<b>0</b>	<b>3,915</b>	<b>4,938</b>	<b>982</b>	<b>2,453</b>
<b>Subtotal Uneven-aged Harvest</b>	<b>0</b>	<b>1,205</b>	<b>2,182</b>	<b>3,449</b>	<b>2,999</b>
<b>Subtotal Two-aged Harvest</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>327</b>	<b>0</b>
<b>Total Old Growth Harvest</b>	<b>0</b>	<b>5,121</b>	<b>7,120</b>	<b>4,757</b>	<b>5,452</b>
<b>Young-Growth (acres)</b>					
Cable, Uniform Thin	0	0	478	355	357
Cable, Strip Thin	0	0	1,131	891	899
Ground-based, Uniform Thin	0	0	691	642	594
<b>Total Young Growth Thinning</b>	<b>0</b>	<b>0</b>	<b>2,299</b>	<b>1,888</b>	<b>1,850</b>
<b>Total Treated Acres</b>	<b>0</b>	<b>5,121</b>	<b>9,419</b>	<b>6,645</b>	<b>7,302</b>

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**Table 2-1.** Comparison of Alternatives by Issue (continued)

Indicator	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
<b>ISSUE 1: TIMBER SUPPLY AND TIMBER SALE ECONOMICS (continued)</b>					
<b>Miles of Road Construction and Reconstruction</b>					
New NFS Road	0	6.8	11.6	0.1	0.4
New NFS Road (Constructed on Decommissioned Road Grade)	0	1.5	2.3	0.1	0.4
New Temporary Road Construction	0	19.6	25.4	3.2	8.1
New Temporary Road (Constructed on Decommissioned Road Grade)	0	4.2	12.1	8.0	7.7
<b>Total New Road Construction</b>	<b>0</b>	<b>32.1</b>	<b>51.4</b>	<b>11.5</b>	<b>16.6</b>
<b>Total Reconstruction of Stored (ML1) NFS Roads</b>	<b>0</b>	<b>18.1</b>	<b>36.7</b>	<b>19.3</b>	<b>17.5</b>
<b>Costs and Benefits</b>					
Logging Costs (\$/MBF) <sup>1/</sup>	\$0	\$240	\$264	\$318	\$303
Haul Cost (\$/MBF) <sup>2/</sup>	\$0	\$47	\$51	\$51	\$49
Road Construction/Maintenance Costs (\$/MBF) <sup>3/</sup>	\$0	\$55	\$60	\$33	\$29
Indicated Bid Value (\$/MBF) <sup>5/</sup>	\$0	\$58.41	\$17.01	(\$13.35)	\$6.75
<b>Total Indicated Bid Value (\$)</b>	<b>\$0</b>	<b>\$6,130,787</b>	<b>\$2,633,034</b>	<b>(\$998,866)</b>	<b>\$679,628</b>
Jobs Related to Logging <sup>4/5/6/</sup>	0	237	350	169	227
Jobs Related to Sawmilling <sup>4/5/6/</sup>	0	121-261	181-348	87-155	118-221
Jobs Related to Transportation and Other Services <sup>4/5/</sup>	0	72-120	119-175	62-85	79-114
<b>Total Annualized Direct Jobs <sup>4/5/6/</sup></b>	<b>0</b>	<b>478-570</b>	<b>706-816</b>	<b>341-386</b>	<b>459-527</b>
Direct Income (\$million) <sup>6/</sup>	0	25.1-26.9	37.0-39.1	17.9-18.8	24.1-25.4
<b>ISSUE 2—OLD GROWTH HABITAT LUD</b>					
<b>LUD Modifications (acres)</b>					
Change in Old Growth Habitat LUD	0	0	+590	+4,270	0
Change in Development LUDs	0	0	-590	-4,270	0
<b>Change in Suitable Timber (acres)</b>					
Change in Mapped Suitable Timber	0	0	+1,174	-1,451	0
<b>Small OGR Modifications Metrics</b>					
# Small OGRs Consistent with Forest Plan Acreage Requirements	11 of 11	11 of 11	11 of 11	11 of 11	11 of 11
Net change in POG in Small OGRs (acres)	0	0	-843	+2,029	0
<b>Sensitive/Rare Plants</b>					
% of Individuals in the Project Area within OGRs for the Lesser Round-leaved Orchid and Whiteflower Rein Orchid	40%/51%	40%/51%	19%/44%	42%/59%	40%/51%

**Table 2-1.** Comparison of Alternatives by Issue (continued)

Indicator	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
<b>ISSUE 3—WILDLIFE AND SUBSISTENCE USE</b>					
<b>Acres of Productive Old Growth (POG) Remaining</b>					
<b>Total POG</b>					
Acres Remaining in Project Area	98,654	93,692	91,748	94,027	93,383
% Change from Existing	0%	-5%	-7%	-5%	-5%
% Change from 1954	-34%	-37%	-39%	-37%	-38%
Acres Remaining in North Central POW Biogeographic Province	569,005	564,043	562,098	564,378	563,734
% Change from Existing	0%	-1%	-1%	-1%	-1%
% Change from 1954	-49%	-49%	-49%	-49%	-49%
<b>High-volume POG</b>					
Acres Remaining in Project Area	43,867	41,246	40,009	41,255	41,115
% Change from Existing	0%	-6%	-9%	-6%	-6%
% Change from 1954	-42%	-46%	-48%	-46%	-46%
Acres Remaining in North Central POW Biogeographic Province	248,324	245,703	244,456	245,712	245,571
% Change from Existing	0%	-1%	-2%	-1%	-1%
% Change from 1954	-59%	-59%	-59%	-59%	-59%
<b>Large-tree POG</b>					
Acres Remaining in Project Area	22,116	20,733	20,122	20,836	20,742
% Change from Existing	0%	-6%	-9%	-6%	-6%
% Change from 1954	-41%	-45%	-46%	-44%	-45%
Acres Remaining in North Central POW Biogeographic Province	127,295	125,912	125,301	126,015	125,921
% Change from Existing	0%	-1%	-2%	-1%	-1%
% Change from 1954	-57%	-57%	-57%	-57%	-57%
<b>Number of POG Patches Remaining by Size Category (in Project Area)</b>					
0-25 acres	308	838	923	716	811
26-100 acres	96	108	109	105	107
101-500 acres	35	36	38	38	37
500-1,000 acres	7	6	7	5	6
1,000+ acres	8	10	9	9	11
% change in total no. patches	0%	+120%	+139%	+92%	+114%
<b>Acres of POG in Remaining Patches by Size Category (all patches intersecting Project Area)</b>					
0-25 acres	3,039	3,653	3,756	3,350	3,529
26-100 acres	4,726	5,384	5,497	5,153	5,268
101-500 acres	7,178	8,301	8,938	8,356	8,111
500-1,000 acres	4,812	4,457	5,276	3,592	4,279
1,000+ acres	82,604	76,189	72,991	78,567	77,113
% change in acres of interior forest habitat in project area	0%	-7%	-14%	-7%	-8%
<b>Deer Winter Habitat Capability Change at Project Completion &amp; After 25 Years (% of 2012 value)</b>					
WAA 1315	0%/-7%	-4%/-11%	-7%/-14%	-4%/-11%	-5%/-12%
WAA 1318	0%/-5%	-4%/-8%	-5%/-9%	-3%/-7%	-4%/-8%
WAA 1319	0%/-4%	-5%/-9%	-6%/-10%	-5%/-9%	-5%/-9%
WAA 1420	0%/-11%	-5%/-16%	-9%/-20%	-4%/-15%	-5%/-16%
North Central Prince of Wales Biogeographic Province	-1%/-4%	-1%/-4%	-1%/-4%	-1%/-4%	-1%/-4%



## 2 Alternatives

**Table 2-1.** Comparison of Alternatives by Issue (continued)

Indicator	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
<b>ISSUE 3—WILDLIFE AND SUBSISTENCE USE (continued)</b>					
<b>Deer Winter Habitat Capability Change at Project Completion &amp; After 25 Years (% of 1954 value)</b>					
WAA 1315	-41%/-45%	-44%/-47%	-45%/-49%	-43%/-47%	-44%/-48%
WAA 1318	-8%/-12%	-11%/-15%	-12%/-16%	-11%/-14%	-11%/-15%
WAA 1319	-24%/-27%	-27%/-30%	-28%/-31%	-27%/-30%	-27%/-30%
WAA 1420	-46%/-52%	-48%/-54%	-51%/-57%	-48%/-55%	-49%/-55%
North Central Prince of Wales Biogeographic Province	-26%/-29%	-27%/-29%	-27%/-29%	-27%/-29%	-27%/-29%
<b>Acres of Deer Winter Range Harvest</b>					
Acres of deep-snow deer winter range harvest proposed (WAAs 1315, 1318, 1319, 1420)	0	1,537	2,385	1,319	1,613
% Change from Existing (by WAA)	0%	-3% to -7%	-6% to -13%	-2% to -6%	-3% to -7%
% Change from 1954 (by WAA)	-35% to -69%	-39% to -70%	-40% to -73%	-39% to -69%	-39% to -71%
<b>Goshawk Habitat Harvest</b>					
Acres of POG & High Volume POG harvest	0/0	4,962/2,621	6,906/3,859	4,627/2,612	5,271/2,752
% Change from 1954 (by VCU)	0 to -61%/0 to -82%	-1% to -65%/- 1 to -84%	-4% to -66%/- 6% to -85%	0 to -67%/0 to -83%	-3% to -67%; -5% to -85%
<b>Marten Deep Snow Winter Habitat Harvest</b>					
Acres of harvest (WAAs 1315, 1318, 1319, 1420)	0	1,537	2,385	1,319	1,613
% Change from Existing (by WAA)	0%	-3% to -7%	-6% to -13%	-2% to -6%	-3% to -7%
% Change from 1954 (by WAA)	-35% to -69%	-39% to -70%	-40% to -73%	-39% to -69%	-39% to -71%
<b>Road Density by Wildlife Analysis Area (WAA) Below 1,200 feet</b>					
Road density—Open & Closed Roads (NFS and non-NFS lands)					
WAA 1315	2.7	2.7	2.8	2.7	2.7
WAA 1318	2.4	2.5	2.5	2.4	2.5
WAA 1319	1.6	1.7	1.7	1.6	1.7
WAA 1420	2.4	2.5	2.5	2.4	2.4
Road density—Open & Closed Roads (NFS lands only)					
WAA 1315	2.1	2.3	2.3	2.1	2.1
WAA 1318	0.7	0.8	0.8	0.7	0.7
WAA 1319	1.6	1.7	1.7	1.6	1.7
WAA 1420	2.5	2.6	2.6	2.5	2.5

**Table 2-1.** Comparison of Alternatives by Issue (continued)

Indicator	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
<b>ISSUE 4—CUMULATIVE WATERSHED EFFECTS<sup>7/</sup></b>					
Subwatersheds with more than 20% of Basin Area Harvested from 1981 to present (young growth 30 years of age or younger) including reasonably foreseeable projects.	§ North Big Salt Lake § N. Kasaan Bay Frntge § Pin <sup>8/</sup> § Thorne Bay	§ North Big Salt Lake § N. Kasaan Bay Frntge § Pin <sup>8/</sup> § Thorne Bay	§ Deer Cr. Luck Lake § North Big Salt Lake § N. Kasaan Bay Frntge § Pin § Thorne Bay	§ North Big Salt Lake § N. Kasaan Bay Frntge § Pin <sup>8/</sup> § Thorne Bay	§ North Big Salt Lake § N. Kasaan Bay Frntge § Pin <sup>8/</sup> § Thorne Bay
Total miles of new road construction (including construction over decommissioned road beds)	0	32	51	11.5	17
Subwatersheds with more than 2.5% of basin area in roads (includes reasonably foreseeable and Big Thorne proposed roads)	§ Deer Creek § Pin <sup>8/</sup> § Ratz Harbor § Salamander § Slide Creek § Thorne Bay § Thorne R. Intertidal <sup>9/</sup> § Torrent	§ Deer Creek § Pin <sup>8/</sup> § Ratz Harbor § Salamand. <sup>8/</sup> § Slide Creek § Thorne Bay § Thorne R. Intertidal <sup>8,9/</sup> § Torrent	§ Deer Creek § Pin § Ratz Harbor § Salamander § Slide Creek § Thorne Bay § Thorne R. Intertidal <sup>9/</sup> § Torrent	§ Deer Creek § Pin <sup>8/</sup> § Ratz Harbor § Salamand. <sup>8/</sup> § Slide Creek § Thorne Bay § Thorne R. Intertidal <sup>9/</sup> § Torrent	§ Deer Creek § Pin <sup>8/</sup> § Ratz Harbor <sup>8/</sup> § Salamand. <sup>8/</sup> § Slide Creek <sup>8/</sup> § Thorne Bay § Thorne R. Intertidal <sup>9/</sup> § Torrent
New Class I & II stream crossings – proposed new roads	0	6	14	0	0
New Class I & II stream crossings – proposed new construction on decommissioned road beds	0	3	9	5	3
New Class III stream crossings– proposed new roads	0	8	12	1	1
New Class III stream crossings – proposed new construction on decommissioned road beds	0	1	3	2	1

Notes:

1/ The harvesting costs for an operator of average efficiency.

2/ Haul Cost: Cost of round-trip truck transport to Klawock or Goose Creek, based on average distance and speed for alternative.

3/ Estimated average cost of new road construction, existing road reconstruction and maintenance.

4/ Memo Employment Coefficients and Indirect Effects, for NEPA planning: 2012 Update Source: Susan Alexander, Alaska Region Economist

5/ Sawmilling employment is based on a range, from maximum possible shipment out of state (50% of hemlock and Sitka spruce, and export of all Alaska yellow cedar), to no shipment of hemlock and Sitka spruce and export of 50% Alaska yellow cedar. Although all Alaska yellow cedar sold from the Tongass National Forest can be exported to foreign markets, regional sawmills often manufacture the species.

6/ Sawmill income is based on the same assumptions as employment and is presented as a range

7/ Analysis conducted at both the watershed and subwatershed scales. Cumulative effects presented in table are for subwatersheds.

8/ No harvest or roads constructed under this alternative. Threshold exceedences are due to past and reasonably foreseeable actions.

9/ Clipped to land area and does not contain marine areas.